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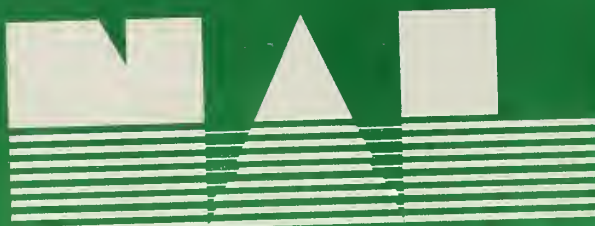
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**United States
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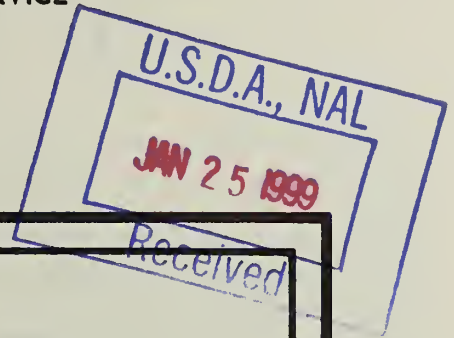


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Washington, D. C.



UNITED STATES
STANDARDS
for grades of
CANNED
ORANGE JUICE



EFFECTIVE JULY 1, 1969

Eighth Issue
As Amended

These standards supersede the standards
which have been in effect since
September 21, 1968

7-11-21
This is the eighth issue of the United States Standards for Grades of Canned Orange Juice as amended.

These standards were published in the Federal Register of November 17, 1964 (29 F.R. 15356), and became effective on that date. Section 52.1559 was amended to raise the maximum Brix-acid ratio from 18.0:1 to 19.5:1 (31 F.R. 16515 December 28, 1966). The standards amended in 1968 (33 F.R. 11881, August 22, 1968) raise the oil limits (Section 52.1558) and change the method for the determination of recoverable oil (Section 52.1560).

Sections 52.1559, 52.1560, and 52.1562 (34 F.R. 7860) were amended May 17, 1969 to change the basis for expressing acid content from grams per 100 milliliters to grams per 100 grams of juice; and make compensating changes in acid and Brix-acid ratio limit values.

An unofficial reprint of the Food and Drug standards of identity, quality, and fill of container is included.

These standards are included in the Code of Federal Regulations, Title 7 -- Agriculture, Part 52.

This grade standard is issued under authority of the Agricultural Marketing Act of 1946 which provides for the issuance of official U.S. grades to designate different levels of quality for the voluntary use of producers, buyers, and consumers. Official grading service is also provided under this Act upon request of the applicant and upon payment of a fee to cover the cost of the service.

As is the case of other standards for processed fruits and vegetables, these standards are designed to serve as a convenient basis for sales, for establishing quality control programs, and for determining loan values. They will also serve as a basis for the inspection of this commodity by Federal inspection service, which is available for the inspection of other processed products as well.

These standards are issued by the Department after careful consideration of all data and views submitted and the Department welcomes suggestions which might aid in improving these standards in future revisions. Comments may be submitted to, and copies of these standards obtained from:

Chief, Processed Products Standardization and Inspection Branch
Fruit and Vegetable Division, AMS
U.S. Department of Agriculture
Washington, D. C. 20250

UNITED STATES STANDARDS FOR GRADES OF CANNED ORANGE JUICE

Effective July 1, 1969

PRODUCT DESCRIPTION, STYLES, GRADES

Sec.

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- 52.1552 Styles.
- 52.1553 Grades.

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FACTORS OF QUALITY

- 52.1555 Ascertaining the grade of a sample unit.
- 52.1556 Ascertaining the rating for the factors which are scored.
- 52.1557 Color.
- 52.1558 Defects.
- 52.1559 Flavor.

EXPLANATIONS AND METHODS OF ANALYSES

- 52.1560 Definitions of terms and methods of analyses.

LOT COMPLIANCE

- 52.1561 Ascertaining the grade of a lot.

SCORE SHEET

- 52.1562 Score sheet for canned orange juice.

AUTHORITY: The provisions of this subpart issued under secs. 202-208, 60 Stat. 1087; 7 U.S.C. 1621-1627.

PRODUCT DESCRIPTION, STYLES, GRADES

§ 52.1551 Product description.

Canned orange juice means the product as defined in the standards of identity for canned orange juice (21 CFR 27.108) issued pursuant to the Federal Food, Drug, and Cosmetic Act.

§ 52.1552 Styles.

- (a) Without sweetener.
- (b) With sweetener.

§ 52.1553 Grades.

- (a) "U.S. Grade A" (or "U.S. Fancy")

NOTE:

Compliance with the provisions of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act or with applicable State laws and regulations.

is the quality of canned orange juice that: (1) Shows no coagulation, (2) has a good color, (3) is practically free from defects, (4) possesses a good flavor, and (5) scores not less than 90 points when scored in accordance with the scoring system outlined in this subpart.

(b) "U.S. Grade C" (or "U.S. Standard") is the quality of canned orange juice that: (1) May show a slight coagulation, (2) has a fairly good color, (3) is fairly free from defects, (4) possesses a fairly good flavor, and (5) scores not less than 80 points when scored in accordance with the scoring system outlined in this subpart.

(c) "Substandard" is the quality of canned orange juice that fails to meet the requirements of U.S. Grade C.

FILL OF CONTAINER

§ 52.1554 Recommended fill of container.

The recommended fill of container is not incorporated in the grades of the finished product since fill of container, as such, is not a factor of quality for the purposes of these grades. It is recommended that the container be as full of orange juice as practicable.

FACTORS OF QUALITY

§ 52.1555 Ascertaining the grade of a sample unit.

(a) *General.* The grade of a sample unit of canned orange juice is ascertained by considering the degree of any coagulation, which is not scored; the ratings for the factors of color, defects, and flavor which are scored; the total score; and the limiting rules which may be applicable.

(b) *Factors rated by score points.* The relative importance of each scoring factor is expressed numerically on the scale of 100. The maximum number of points that may be given such factors are:

Factor:	Points
Color -----	40
Defects -----	20
Flavor -----	40
Total -----	100

§ 52.1556 Ascertaining the rating for the factors which are scored.

The essential variations within each factor which is scored are so described that the value may be ascertained for each factor and expressed numerically. The numerical range within each factor which is scored is inclusive (for example, "18 to 20 points" means 18, 19, or 20 points).

§ 52.1557 Color.

(a) *Evaluation of color.* (1) The color of canned orange juice is evaluated by comparing the color of the product with the USDA Orange Juice Color Standards so that these color standards become points of reference.

(2) Such comparison is made under an artificial light source of approximately 150 candela intensity and having a spectral quality approximating that of daylight under a moderately overcast sky and a color temperature of 7500 degrees Kelvin, ± 200 degrees.

(3) The USDA Orange Juice Color Standards range from yellow-orange to yellow color, with USDA OJ 1 being the most orange color in the series.

(b) *Procedure in evaluating color.* (1) Place the product in a clear glass test tube of 1 inch diameter.

(2) Arrange color standards in a test tube rack or similar device so that light coming from above strikes the standards at a 45 degree angle. The standards are inclined at a 45 degree angle against a neutral grey background. Observe the standards and product at right angles to the tubes.

(3) Classify the juice by inserting the tube of juice where it best fits in the series of color standards. Orange juice differing in color and brightness from the most nearly matching USDA Orange Juice Color Standard is evaluated by considering the amount of difference and its effect on the total appearance of the juice.

(c) *Availability of color standards.* The USDA Orange Juice Color Standards cited in this section are official color standards which may also be applied to other orange juices. Information regarding these color standards, and their availability, may be obtained from:

Processed Products Standardization and Inspection Branch,
Fruit and Vegetable Division,
Agricultural Marketing Service,
U.S. Department of Agriculture,
Washington, D.C., 20250.

(d) (A) *Classification.* Canned orange juice that has a good color may be given a score of 36 to 40 points. "Good color" means a bright yellow to yellow-orange color, typical of orange juice color. Canned orange juice that meets this criterion may be assigned score points in accordance with the following schedule:

As compared with USDA Orange Juice Color Standards:	Score
Equal to or better than USDA OJ 2 -----	40 points
Equal to or better than USDA OJ 3 -----	39 points
Equal to or better than USDA OJ 4 -----	38 points
Equal to or better than USDA OJ 5 -----	37 points
Equal to or better than USDA OJ 6 -----	36 points

(e) (C) *Classification.* If the canned orange juice has a fairly good color, a score of 32 to 35 points may be given. Canned orange juice that falls into this classification shall not be graded above U.S. Grade C, regardless of the total score for the product (this is a limiting rule). "Fairly good color" means a color that is not as good as USDA OJ 6. It may be slightly amber or very light in hue, or it may show slight evidence of browning; but is typical of canned orange juice.

(f) (SStd.) *Classification.* If the canned orange juice fails to meet the requirements of paragraph (e) of this section a score of 0 to 31 points may be given. Canned orange juice that falls into this classification shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

§ 52.1558 Defects.

(a) *General.* The factor of defects refers to the degree of freedom from recoverable oil; from particles of membrane, core, or skin; from seeds or seed particles; and from other defects.

(b) (A) *classification.* Canned orange juice that is practically free from defects may be given a score of 18 to 20 points. "Practically free from defects" means that there may be present not more than 0.035 percent by volume of recoverable oil and that the juice does not contain particles of membrane, core, or skin, seeds, or seed particles, or other defects that affect more than slightly the appearance of the product.

(c) (C) *classification.* If the canned orange juice is fairly free from defects, a score of 16 or 17 points may be given. Canned orange juice that falls into this classification shall not be graded above U.S. Grade C, regardless of the total score for the product (this is a limiting rule). "Fairly free from defects" means that there may be present not more than 0.055 percent by volume of recoverable oil and that the juice does not contain particles of membrane, core, or skin, seeds, or seed particles, or other defects that affect materially the appearance of the product.

(d) (SStd.) *Classification.* Canned orange juice that fails to meet the requirements of paragraph (c) of this section may be given a score of 0 to 15 points and shall not be graded above Substandard regardless of the total score for the product (this is a limiting rule).

§ 52.1559 Flavor.

(a) (A) *Classification.* Canned orange juice that possesses a good flavor

may be given a score of 36 to 40 points. "Good flavor" means a fine, distinct canned orange juice flavor which is definitely free from traces of scorching, caramelization, oxidation, or terpene; is free from off flavors of any kind; and meets the following requirements for the respective styles; and when produced from fruit grown in the geographical areas indicated:

(1) *Without sweetener style.*

	Minimum	Maximum
Brix (degrees).....	10.5.....	
Acid (per 100 grams):		
California or Arizona.....	0.70 gm.....	1.40 gms.
Outside California or Arizona.....	0.60 gm.....	1.40 gms.
Brix-acid ratio:		
If Brix is less than 11.5°.....	10.5:1.....	20.5:1.
If Brix is 11.5° or more.....	9.5:1.....	20.5:1.

(2) *With sweetener styles.*

	Minimum	Maximum
Brix (degrees).....	10.5.....	
Acid (per 100 grams):		
California or Arizona.....	0.70 gm.....	1.40 gms.
Outside California or Arizona.....	0.60 gm.....	1.40 gms.
Brix-acid ratio:		
If Brix is less than 15°.....	12.5:1.....	20.5:1.
If Brix is 15° or more.....	9.5:1.....	20.5:1.

(b) (C) *Classification.* If the canned orange juice possesses a good flavor, a score of 32 to 35 points may be given. Canned orange juice that falls into this classification shall not be graded above U.S. Grade C, regardless of the total score for the product (this is a limiting rule). "Fairly good flavor" means a good, normal canned orange juice flavor which may have a slightly caramelized

or slightly oxidized flavor but is free from off flavors of any kind and meets the following requirements for the respective style; and when produced from fruit grown in the geographical areas indicated:

(1) *Without sweetener style.*

	Minimum	Maximum
Brix (degrees).....	10.0°.....	
Acid (per 100 grams).....	0.55 gm.....	1.55 gms.
Brix-acid ratio.....	9.5:1.....	20.5:1.

(2) *With sweetener style.*

	Minimum	Maximum
Brix (degrees).....	10.5.....	
Acid (per 100 grams):		
California or Arizona.....	0.60 gm.....	1.60 gms.
Outside California or Arizona.....	0.60 gm.....	1.60 gms.
Brix-acid ratio:		
If Brix is less than 15°.....	12.5:1.....	20.5:1.
If Brix is 15° or more.....	9.5:1.....	20.5:1.

(c) (*SStd*) *Classification.* Canned orange juice that fails to meet the requirements of paragraph (b) of this section, or is off flavor for any reason, may be given a score of 0 to 31 points and shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

EXPLANATIONS AND METHODS OF ANALYSES
§ 52.1560 Definitions of terms and methods of analyses.

(a) *Brix.* "Brix" means the degrees Brix of canned orange juice when tested with a Brix hydrometer calibrated at 20 degrees C. (68 degrees F.). If used in testing juice at a temperature other than 20 degrees C. (68 degrees F.) the applicable temperature correction shall be made to the reading of the scale as prescribed in the "Official Methods of Analy-

sis of the Association of Official Agricultural Chemists." The degrees Brix of canned orange juice may be determined by any other method which gives equivalent results.

(b) *Acid.* "Acid" means the grams of total acidity, calculated as anhydrous citric acid, per 100 grams of canned orange juice. Total acidity is determined by titration with standard sodium hydroxide solution using phenolphthalein as indicator.

(c) *Brix-acid ratio.* The "brix-acid ratio" is the ratio of the degrees Brix of the canned orange juice to the grams of anhydrous citric acid per 100 grams of the juice.

(d) *Recoverable oil.* "Recoverable oil" is determined by the following method:

METHOD

(1) *Reagents.*

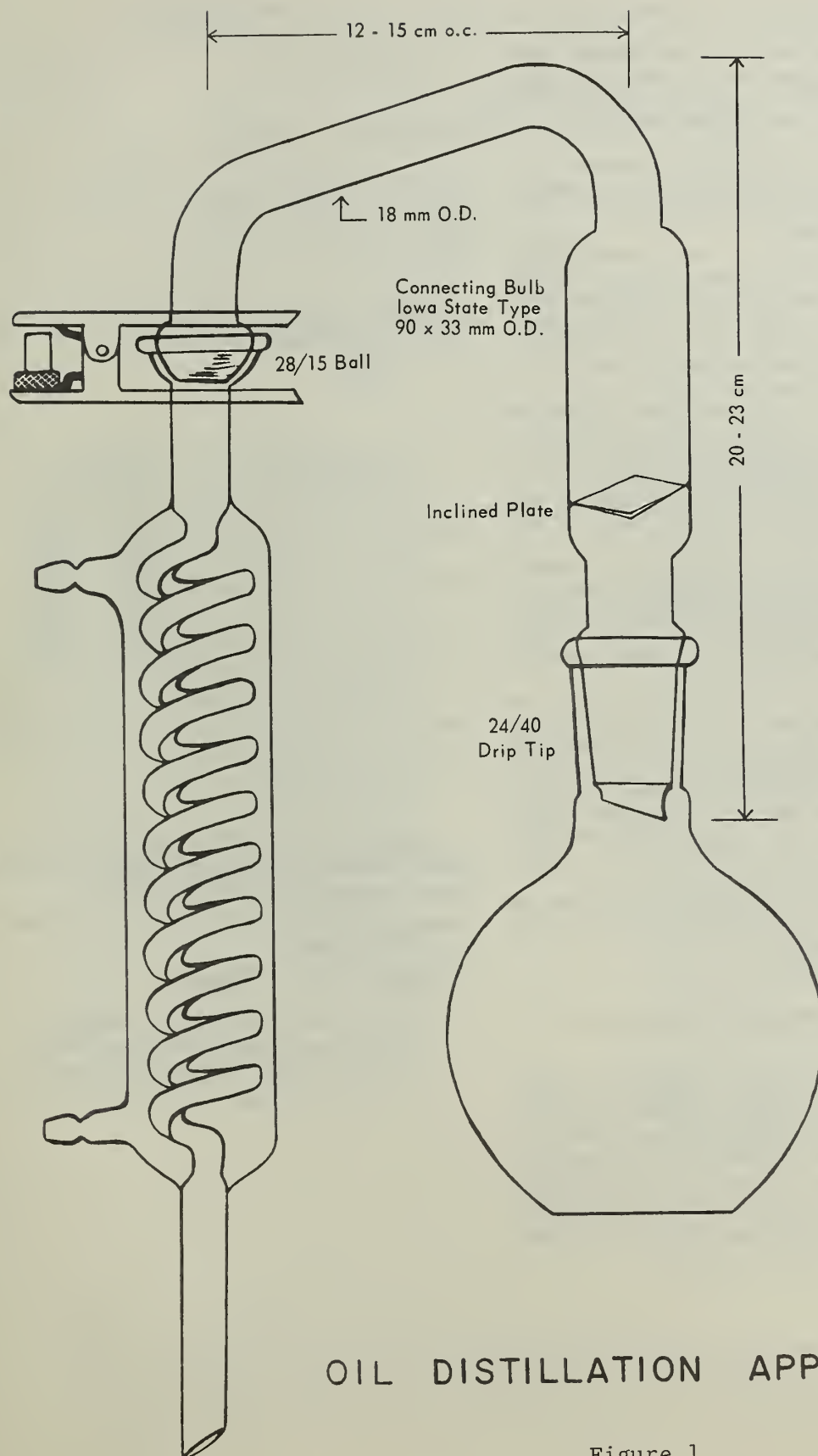
Standard bromide-bromate solution—prepared and standardized to 0.099N in accordance with Chapter 42, Standard Solutions in the current edition of the AOAC.¹ For use, add 1 volume of standard solution to 3 volumes of water to make 0.0247N solution. 1 ml. of 0.0247N solution supplies bromine to react with 0.00085g., or 0.0010 ml., of *d*-limonene. The solutions are stable for 6 months.

2-Propanol—Reagent grade ACS (American Chemical Society).

Dilute hydrochloric acid—prepared by adding 1 volume of concentrated acid to 2 volumes of water.

Methyl orange indicator—0.1 percent in water.

¹"AOAC" refers to the Official Methods of Analysis published by the Association of Official Analytical (formerly Agricultural) Chemists. Copies may be obtained from this Association at Box 540, Benjamin Franklin Station, Washington, D.C. 20044.



OIL DISTILLATION APPARATUS

Figure 1

(2) *Apparatus.*

Electric heater—with recessed refractory top, 500–750 watts.

Still, all glass—500 ml. distillation flask with 24/40 standard taper neck; 200 mm. Graham condenser with 28/15 receiving socket and drip tip; connecting bulb and adapter as shown in Figure 1.

Burette—10 ml. or 25 ml. graduated to 0.1 ml., with easily controllable flow to permit both rapid and dropwise titration.

(3) *Determination.*

(i) Pipette 25 ml. of well-mixed sample (juice or reconstituted juice) into the distillation flask containing carborundum chips or glass beads, and add 25 ml. of 2-Propanol.

(ii) Distill into a 150 ml. beaker. Continue distilling until solvent ceases to reflux then remove the flask from the heater.

(iii) Add 10 ml. of dilute hydrochloric acid and 1 drop of indicator. (An alternative method would be to prepare a solution containing 5 ml. of indicator and 1,000 ml. of dilute hydrochloric acid—then add 10 ml. of this acid-indicator mix to the 150 ml. beaker.)

(iv) Titrate with the dilute bromate solution while stirring. The major portion of the titrant may be added rapidly, but the endpoint must be approached at about 1 drop per second. Disappearance of color indicates the endpoint.

(v) Determine the reagent blank by titrating three separate mixtures of 25 ml. 2-Propanol and 10 ml. of dilute hydrochloric acid with indicator—without refilling the burette. Divide the total milliliters of titrant used by three to obtain the average blank. Subtract the average blank thus obtained from the milliliters of titrant used to titrate the distillate.

(vi) Multiply the remainder by 0.004 to obtain the percent recoverable oil by volume in the juice sample.

LOT COMPLIANCE

§ 52.1561 Ascertaining the grade of a lot.

The grade of a lot of canned orange juice covered by these standards is determined by the procedures set forth in the Regulations Governing Inspection and Certification of Processed Fruits and Vegetables, Processed Products Thereof, and Certain Other Processed Food Products (§§ 52.1 through 52.87).

SCORE SHEET

§ 52.1562 Score sheet for canned orange juice.

Size and kind of container.....		
Container mark or identification.....		{ Cans..... Cases.....
Label (including ingredient statement, if any).....		
Liquid measure (fluid ounces).....		
Vacuum (inches).....		
Style.....		
Brix (degrees).....		
Acid (grams/100 gm.: calculated as anhydrous citric acid).....		
Brix-acid ratio (:1).....		
Recoverable oil (percent by volume).....		
Degree of coagulation:		
() None.		
() Slight.		
() Serious.		

Factors	Score points	
Color.....	40	{ (A) 36-40 (C) 32-35 (SStd.) 1 0-31
Defects.....	20	{ (A) 18-20 (C) 16-17 (SStd.) 1 0-15
Flavor.....	40	{ (A) 36-40 (C) 32-35 (SStd.) 1 0-31
Total score.....	100	
Grade.....		

¹ Indicates limiting rule.

Effective date. The amendments to each affected grade standard shall become effective on July 1, 1969.

(Secs. 202–208, 60 Stat. 1087, as amended; 7 U.S.C. 1621–1627)

Dated: May 12, 1969.

JOHN E. TROMER,
Acting Deputy Administrator,
Marketing Services.

Published in the Federal Register of November 17, 1964 (29 F.R. 15356)

Section 52.1559 amended December 28, 1966 (31 F.R. 16515)

Sections 52.1558 and 52.1560 amended August 22, 1968 (33 F.R. 11881)

Sections 52.1559, 52.1560, and 52.1562 amended May 17, 1969 (34 F.R. 7860)

EXCERPT FROM TITLE 21 – FOOD AND DRUGS

CHAPTER 1 – FOOD AND DRUG ADMINISTRATION, DEPARTMENT OF
HEALTH, EDUCATION, AND WELFAREPart 27 – Canned Fruits; Definitions and Standards of Identity;
Quality; and Fill of Container**§ 27.108 Canned orange juice; identity;
label statement of optional ingredi-
ents.**

(a) Canned orange juice is the food prepared from orange juice as specified in § 27.105 or frozen orange juice as specified in § 27.106, or a combination of both, to which may be added not more than 10 percent by volume of the unfermented juice obtained from mature oranges of the species *Citrus reticulata* or hybrids thereof. Seeds (except embryonic seeds and small fragments of seeds that cannot be separated by good manufacturing practice) are removed. Orange oil and pulp may be adjusted in accordance with good manufacturing practice. The adjustment of pulp referred to in this paragraph does not permit the addition of washed or spent pulp. Liquid condensate recovered from the deoiling operation may be added back. One or more of the optional sweetening ingredients named in paragraph (b) of this section may be added, in a quantity reasonably necessary to raise the Brix or the Brix-acid ratio to any point within the normal range usually found in unfermented juice obtained from mature oranges as specified in § 27.105. The food is sealed in containers and so processed by heat, either before or after sealing, as to prevent spoilage. The finished canned orange juice tests not less than 10° Brix, and the ratio of the Brix hydrometer reading to the grams of anhydrous citric acid per 100 milliliters of juice is not less than 9 to 1.

(b) The optional sweetening ingredients referred to in paragraph (a) of this section are sugar, invert sugar, dextrose, dried corn sirup, dried glucose sirup.

(c) The name of the food is "canned orange juice." All the words in the name shall appear in the same size, color, and style of type and on the same color-contrasting background. If the food is not sold under refrigeration and if it does not purport to be chilled pasteurized orange juice or frozen pasteurized orange juice, the word "canned" may be omitted from the name.

(d) If one or more of the sweetening ingredients specified in paragraph (b) of this section are added to the canned orange juice, the label shall bear the statement "----- added," the blank being filled in with the name or an appropriate combination of the names of the sweetening ingredients used. However, for the purpose of this section, the name "sweetener" may be used in lieu of the specific name or names of the sweetening ingredients.

(e) Wherever the name of the food appears on the label so conspicuously as to be easily seen under customary conditions of purchase, the statement specified in this section for naming the optional ingredients used shall immediately and conspicuously precede or follow the name of the food, without intervening written, printed, or graphic matter.

Effective December 29, 1965.

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